REMARKS

Claims 1-32 are pending. Claims 11, 14-17, 21, and 29 have been amended.

The applicant regrets the confusing language that appears in the original Declaration. Accordingly, a Supplemental Declaration is included with this response.

In the Drawings

Figures 1 and 2 have been amended to correct several reference marks. No new matter has been added.

In the Specification

The specification has been amended to address the informalities noted by the Examiner, as well as several additional informalities. No new matter has been added.

Rejection of Claims under 35 U.S.C. § 112

Claim 14 is rejected under 35 U.S.C. § 112, second paragraph. Claim 14 has been amended to address the Examiner's rejections. Additionally, claims 15 and 16 have been amended to reflect the amendment of claim 14. The applicant respectfully submits that these amendments in no way change the scope of coverage of claims 14-16.

Rejection of Claims under 35 U.S.C. § 102/103

Claims 1, 3, 9, and 14 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Woodgate et al., U.S. Patent No. 6,008,484 (Woodgate). Claims 2, 4-7, 11, and 12 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Woodgate in view of Official Notice. Claim 13 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Woodgate in view of Official Notice, and further in view of Iwata et al., U.S. Patent 5,982,342 (Iwata). Claim 8 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Woodgate in view of Iwata. Claims 10, 16-18, 22, 23, 25-27, 29, and 32 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Woodgate in view of Burger, U.S. Patent 5,973,844. Claims 20, 28, and 31 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Woodgate in view of Burger and further in

view of Iwata. Claims 19, 21, and 30 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Woodgate in view of Burger, and further in view of Ashihara et al., U.S. Patent 5,883,739 (Ashihara). Claim 24 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Woodgate in view of Burger, and further in view of Official Notice. The applicant respectfully traverses these rejections.

Woodgate neither teaches nor suggests an apparatus for displaying a three-dimensional image including:

> a plurality of lenslet pixel modules with each module defined in part by a respective lenslet;
>
> each lenslet pixel module corresponding with a pixel of the three-dimensional image;

as required by independent claim 1, and generally required by independent claims 17, 25, and 29.

Regarding the claimed "plurality of lenslet pixel modules with each module defined in part by a respective lenslet," the applicant respectfully submits that the particular parts of the cited references that the Examiner has relied upon have not been designated as nearly as practicable, and the pertinence of the reference has not been clearly explained, both as required by 37 C.F.R. § 1.104(c)(2). For this claim limitation the Examiner refers to reference number **3** and **Figure 20** of Woodgate. In the context of **Figure 20**, item **3** is referred to as a "parallax optic." Thus, it is unclear which portions of the Woodgate reference the Examiner believes teach or suggest the claimed plurality of lenslet pixel modules and which portions teach or suggest the claimed respective lenslet.

Regarding the claim limitation "each lenslet pixel module corresponding with a pixel of the three-dimensional image," the Examiner refers to **Figure 20** and column 1, lines 51-55 of Woodgate. The applicant respectfully submits that **Figure 20** does not teach or suggest that each lenslet pixel module corresponds with *a pixel* of the three-dimensional image. **Figure 20** illustrates a tracking arrangement for controlling view switching in certain types of displays. As previously noted, it is unclear from the Examiner's arguments which portions of Woodgate allegedly correspond to the lenslet

pixel module. Moreover, there is nothing illustrated in **Figure 20** (or its corresponding description in column 12, lines 4-19) that teaches or suggests that each lenslet pixel module corresponds with *a pixel* of the three-dimensional image. The portion of column 1 cited by the Examiner states:

> Alternate columns of pixels display vertical strips of a respective 2D image and the lenticules 4 direct light from the backlight passing through the columns 5 and 6 into two viewing zones 7 and 8 for the left and right eyes of an observer.

As with **Figure 20**, the applicant respectfully submits that there is nothing in this cited portion of Woodgate that teaches or suggests that each lenslet pixel module corresponds with *a pixel* of the three-dimensional image.

Accordingly, the applicant respectfully submits that independent claims 1, 17, 25, and 29 is allowable over Woodgate, Official Notice, Iwata, Burger, and Ashihara, taken alone or in combination. Claims 2-16 depend from independent claim 1 and are allowable for at least this reason. Claims 18-28 depend from independent claim 17 and are allowable for at least this reason. Claims 26-28 depend from independent claim 25 and are allowable for at least this reason. Claims 30-32 depend from independent claim 29 and are allowable for at least this reason.

In view of the amendments and remarks set forth herein, the application is believed to be in condition for allowance and a notice to that effect is solicited. Nonetheless, should any issues remain that might be subject to resolution through a telephonic interview, the examiner is requested to telephone the undersigned.

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail in an envelope addressed to: Box Non-Fee Amendment, Commissioner for Patents, Washington, D.C. 20231, on 12/13, 2001.

Attorney for Applicant(s) — Date of Signature: 12/13/01

Respectfully submitted,

Marc R. Ascolese
Attorney for Applicant(s)
Reg. No. 42,268
(512) 794-3600
(512) 794-3601 (fax)

Appendix: Version with Markings to Show Changes Made

Please replace the paragraph on page 14, lines 4-19 with the following paragraph:

Various embodiments of the present invention will be described with respect to lens sheets and lenslets satisfactory for use in forming 3D displays incorporating teachings of the present invention. These lens sheets and lenslets may be formed from a wide variety of optically transparent materials such as plastics and glass. Lens sheets and lenslets are often formed using injection molding techniques. Commercially available optical design and fabrication methods may be used to form various components of an electronic display incorporating teachings of the present invention. Also, the selection of various optical elements, their respective locations and optical characteristics such as aperture, diameter and focal length may be determined in accordance with commercially available techniques associated with digital electronic and holographic displays.

Please replace the paragraph on page 16, line 24 through page 17, line 2 with the following paragraph:

FIGURES 3 and 4 are schematic diagrams showing one example of a lenticular screen display indicated generally at [3D]30. A principle advantage of a lenticular screen display such as display [3D]30 is its superior optical efficiency or brightness compared to a parallax barrier display.

Please replace the paragraph on page 17, lines 3-12 with the following paragraph:

For the example shown in FIGURES 3 and 4 lenticular screen display [3D]30 preferably includes lenticular lens sheet 32 have a plurality of parallel, vertical lenticules 34 [form]formed on one surface thereof. A specially prepared picture or film 38 may be disposed adjacent to lenticular lens sheet 32 opposite from lenticules 34 as shown in FIGURE 4. Picture or film 38 preferably includes one or more 2D images which will be projected from lenticular lens sheet 32 as a horizontal parallax only 3D image.

Please replace the paragraph on page 18, lines 14-19 with the following paragraph:

Parallax barrier screen display 20 and lenticular screen display [3D]30 are horizontal parallax only displays. These displays may be modified to full parallax displays by replacing parallax barrier sheet 22 or lenticular lens sheet 32 with a pinhole array and a fly's eye lens sheet respectively.

Please replace the paragraph on page 19, lines 3-9 with the following paragraph:

Two-dimensional image source 58 is preferably disposed on fly's eye lens sheet 52 opposite from lenslets 54. Two-dimensional image source 58 may be a picture or film as previously described with respect to lenticular screen display [3D]30. For some applications 2D image source 58 may be a moving image screen or other moving image source.

Please replace the paragraph on page 19, lines 10-26 with the following paragraph:

Full parallax displays such as display 50 provide more realistic 3D images as compared to horizontal parallax only displays such as displays 20 and [3D]30. The difference is most apparent when an observer moves in a vertical direction relative to the displays. Another benefit of a full parallax display is in the freedom it allows an observer to view a display from any distance without observing the anamorphic distortions which are inherent in horizontal parallax only displays. The reason for these anamorphic distortions in lenticular displays such as display [3D]30 is the fact that the vertical dimension of the images behind lenticules 34 is fixed. The relative sizes of objects in the real world change with the viewing distance. Since the vertical dimension of objects in lenticular display [3D]30 is fixed, there can only be one viewing distance for which the vertical dimensions of the resulting 3D image are correct.

Please replace the paragraph on page 20, line 17 through page 21, line 5 with the following paragraph:

FIGURE 8 depicts a side view of a model of a cat placed in front of fly's eye lens sheet 52. For purposes of explanation a layer of photosensitive recording material may be placed on lens sheet 52 at the surface previously occupied by 2D [source] image

source 58. Lenslets 52 appear to image the cat as one would expect from the laws of optics, namely a small inverted image of the cat from the perspective of each lenslet is imaged behind it on the photosensitive recording material at the 2D image source plane. Since the cat is facing fly's eye lens sheet 52, each lenslet 54 images a front view of the cat. When the photosensitive recording material is developed and placed exactly back in the same position it was in during exposure, a reconstructed image of the cat will be presented, as the laws of optics would predict, in front of fly's eye lens sheet 52.

Please replace the paragraph on page 25, lines 9-16 with the following paragraph:

Various types of commercially available light valves and light modulators may be satisfactorily used as high resolution 2D image source 78. For the embodiment shown in FIGURE 9, high resolution 2D image source 78 may be a digital flat panel display (FPD), an LCD or CRT. Other types of high resolution 2D image sources [including]include light emitting diodes (LED). DMD mirrors and MEMS may also be satisfactorily used to form lenslet pixel modules 70.

Please replace the paragraph on page 25, line 24 through page 26, line 4 with the following paragraph:

A standard video source (not expressly shown) [shown]such as NTSC or VGA may be connected to high resolution 2D image source 78. For other applications, digital data may be supplied to high resolution 2D image source 78 which then converts the digital data into the desired 2D image. An important aspect of the present invention includes providing moving images or even live images to lenslet pixel modules 70.

The claims are amended as follows:

11. (Amended) The apparatus of Claim 1 [further comprising the high resolution]wherein at least one of the plurality of two-dimensional moving image [source]sources is selected from the group consisting of a cathode ray tube, a liquid crystal display, digital micro device mirror, a flat panel display, a respective section of a diffuser backlit by a video projection system, a microelectronicmechanical system, or a light emitting diode.

14. (Amended) The apparatus of Claim 1 further comprising:

the plurality of lenslet pixel modules disposed in an array relative to each other;

a plurality of sensors interspersed within the array of lenslet pixel modules;

the sensors cooperating with each other to form a sensor array having a first focal plane; and

the lenslet pixel modules cooperating with each other such that [to form a] the projector array [having]has a second focal plane.

15. (Amended) The apparatus Claim 14 [further comprising]wherein the first focal plane [of the sensor array corresponding]corresponds generally with the second focal plane [of the projector array].

16. (Amended) The apparatus of Claim 14 [further comprising]wherein the first focal plane [of the sensor array having]has an orientation different from the second focal plane [of the projector array].

17. (Amended) A system for presenting a scalable, autostereoscopic image comprising:

a plurality of lenslet pixel modules with each module defined in part by a respective lenslet;

each lenslet pixel module corresponding with a 3D pixel of the autostereoscopic image;

a plurality of two-dimensional image sources associated with and forming a portion of each lenslet pixel module; and

at least one computer processing unit providing an input to [the]at least one of the plurality of two-dimensional [high resolution] image sources.

21. (Amended) The system of Claim 17 further comprising:

a plurality of first computer processing units having at least one video output channel to supply video images to the high resolution [two-dimensional] image sources;

two-dimensional image source coupled with one of the first computer processing

units; and

a master computer processing unit coupled with and supplying data to the first computer processing units.

29. (Amended) A lenslet pixel module for projecting light and sensing light comprising:

a two-dimensional image source operably coupled with a respective lenslet whereby a portion of a selected two-dimensional image may be projected from the lenslet to form a portion of an image;

a sensor disposed within and forming a portion of the lenslet pixel module; and

the sensor operably coupled with [the]a fly's eye lenslet to allow the sensor to detect at least one real object in front of the lenslet pixel module.